GATES LEARJET CORPORATION

maintenance manual

CHAPTER

36

PNEUMATIC

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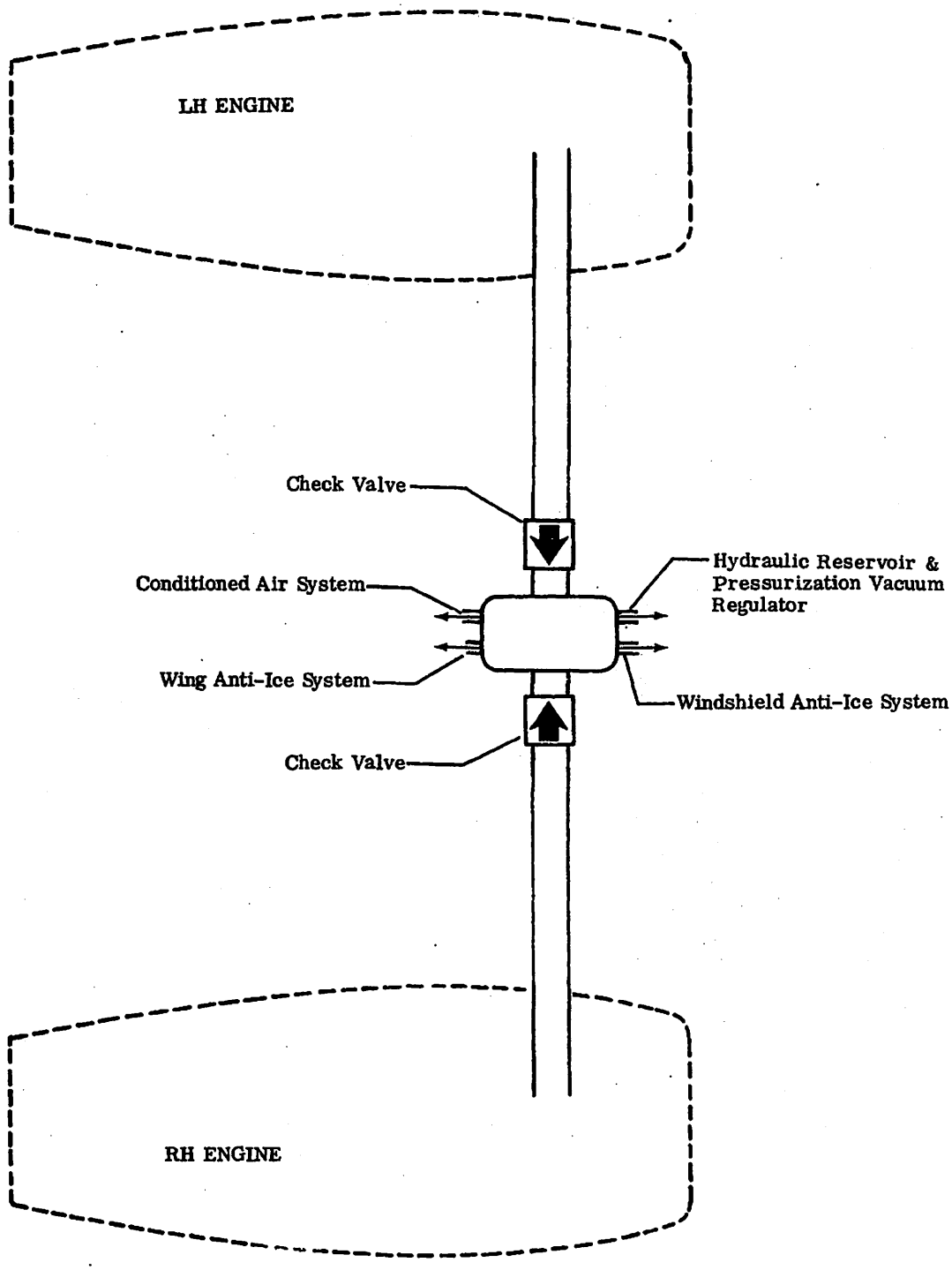
PNEUMATIC - DESCRIPTION AND OPERATION

1. General
 A. The engine bleed air (pneumatic) system is utilized for cabin air conditioning cabin pressure control, windshield anti-icing and wing leading edge anti-icing.
 B. Engine bleed air is routed through ducts to a central distribution point within the tailcone.

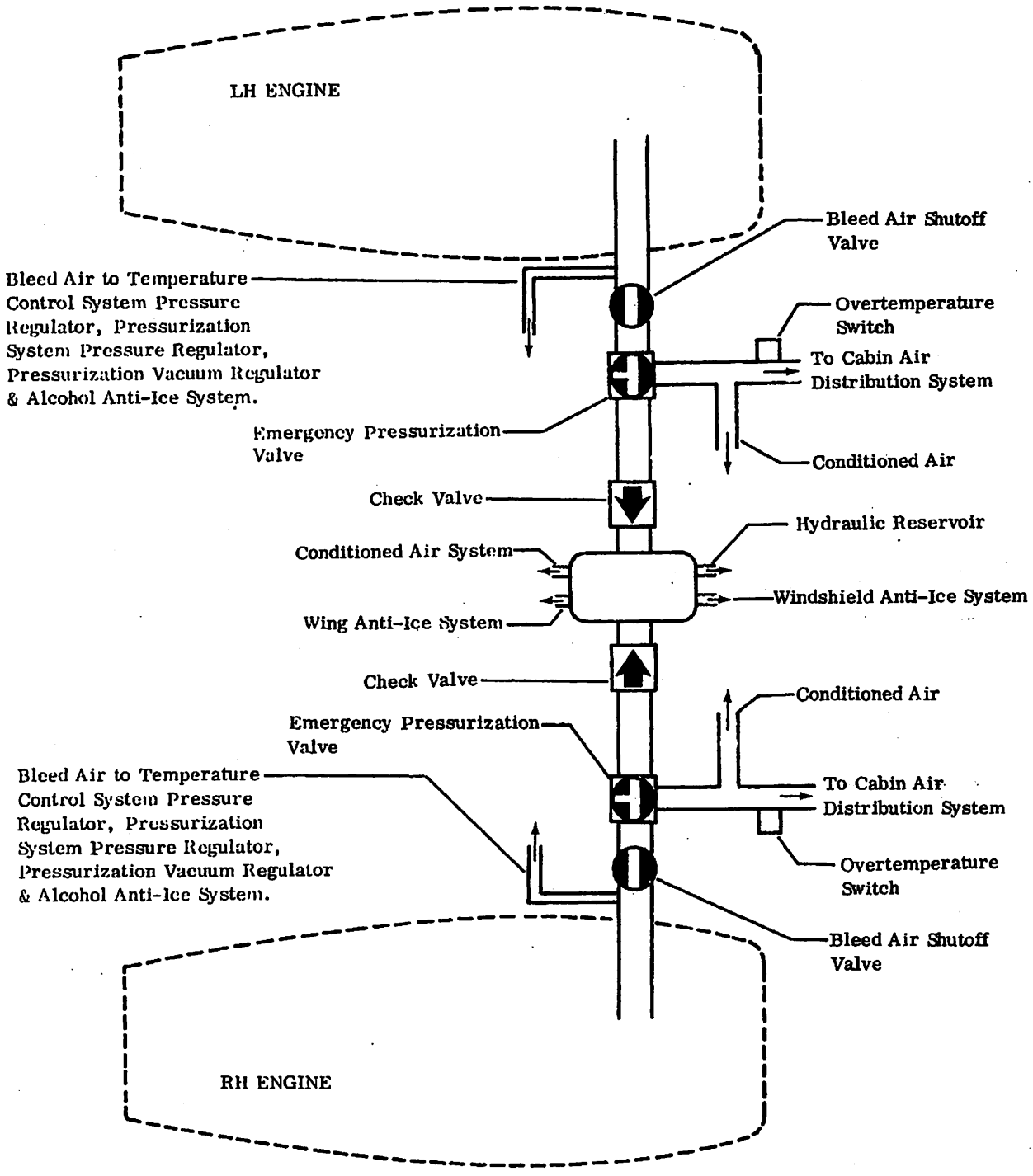
2. Description
 A. On Aircraft 25-061, 25-070 thru 25-226, the pneumatic distribution system consists of two basically independent systems (one for each engine) connected to a common distribution point. Each duct system incorporates a bleed air check valve to prevent loss of engine bleed air if one engine is shut down. Bleed air (pneumatic) is provided to the following:
 (1) A flow control valve to provide conditioned air for the cabin (Chapter 21).
 (2) A shutoff valve and pressure regulator for windshield anti-icing (Chapter 30).
 (3) A shutoff valve to provide for wing leading edge anti-icing (Chapter 30).
 (4) Hydraulic reservoir pressurization (Chapter 29) and vacuum pressure regulator (Chapter 37).
 B. On Aircraft 25-227 thru 25-256, the pneumatic system consists of two basically independent distribution systems (one for each engine) connected at a common distribution point. Each distribution system consists of a check valve, an emergency pressurization valve, and an engine bleed air shutoff valve. (Refer to Chapter 21 for Emergency Pressurization Valve, and Pressurization Regulator Valve.) The emergency pressurization valves and engine bleed air shutoff valves constitute the ECS control valves and are controlled through two ECS Valve Control Boxes by the respective LH or RH BLEED AIR Switch. Each BLEED AIR Switch has three positions: EMER, ON, and OFF, and is located on the main switch panel. Bleed air (pneumatic) is provided to the following:
 (1) The alcohol anti-ice system to pressurize the alcohol supply tank (Chapter 30).
 (2) The flow control valve to provide conditioned air for the cabin (Chapter 21).
 (3) A shutoff valve and pressure regulator for windshield anti-icing (Chapter 30).
 (4) A shutoff valve to provide for wing leading edge anti-icing (Chapter 30).
 (5) A fitting on the bleed air manifold for hydraulic reservoir pressurization (Chapter 29).
 (6) The temperature control system pressure regulator (Chapter 21) and the pressurization system (Chapter 21).
 (7) The vacuum pressure regulator (Chapter 37).

C. On Aircraft 25-257 and Subsequent, the pneumatic system consists of two basically independent distribution systems (one for each engine) connected at a common distribution point. Each distribution system consists of a check valve, an emergency pressurization valve, and an engine bleed air shutoff valve. (Refer to Chapter 21 for Emergency Pressurization Valve, and Pressurization Regulator Valve.) The emergency pressurization valves and engine bleed air shutoff valves constitute the ECS control valves and are controlled through two ECS Valve Control Boxes by the respective LH or RH BLEED AIR Switch. Each BLEED AIR Switch has three positions, EMER, ON, and OFF, and is located on the pressurization module control panel. Bleed air (pneumatic) is provided to the following:

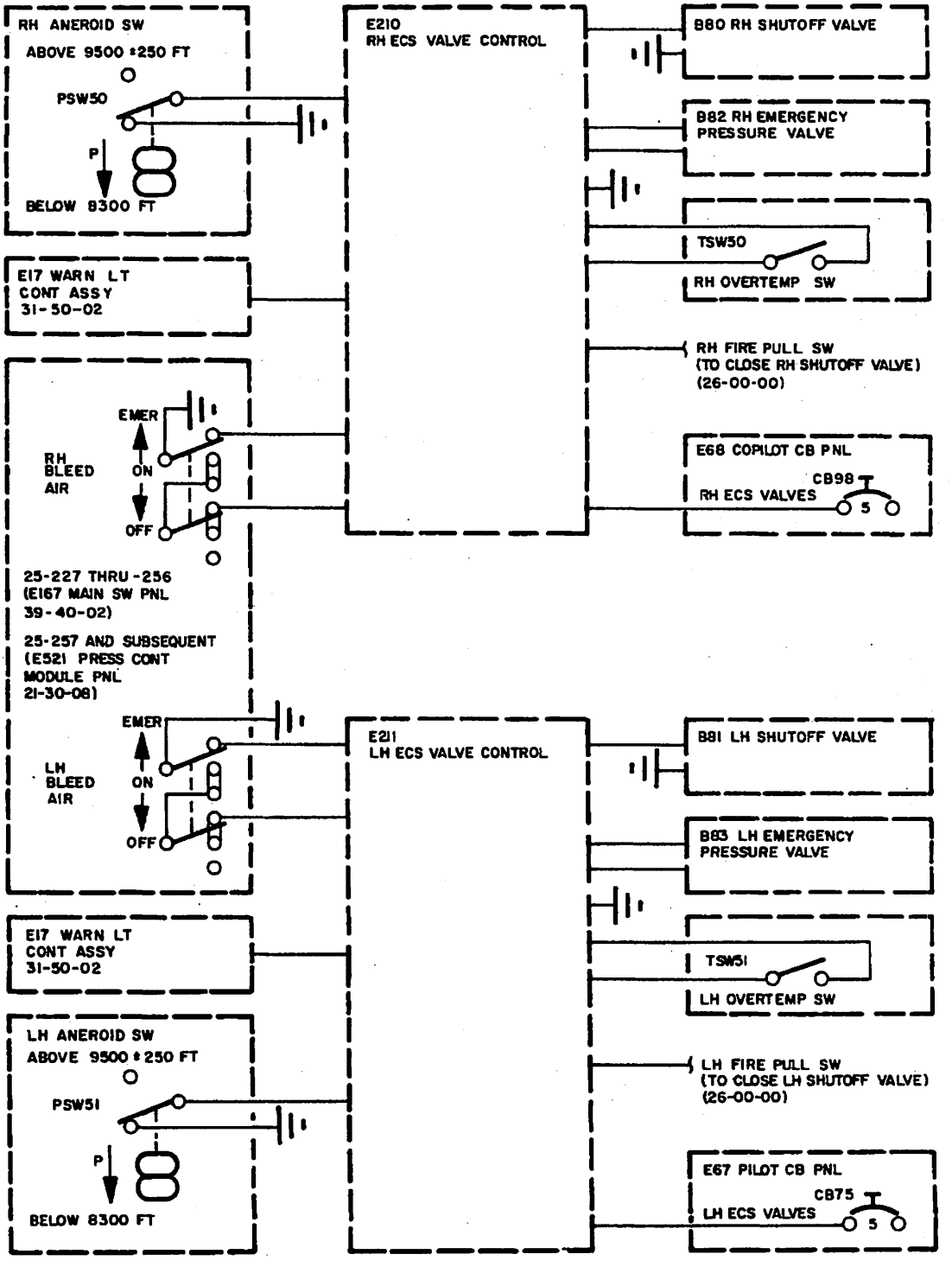
(1) The alcohol anti-ice system to pressurize the alcohol supply tank (Chapter 30).
(2) The flow control valve to provide conditioned air for the cabin (Chapter 21).
(3) A shutoff valve and pressure regulator for windshield anti-icing (Chapter 30).
(4) A shutoff valve to provide for wing leading edge anti-icing (Chapter 30).
(5) A fitting on the bleed air manifold for hydraulic reservoir pressurization (Chapter 29).
(6) The temperature control system pressure regulator (Chapter 21) and the pressurization system (Chapter 21).
(7) The vacuum pressure regulator (Chapter 37).



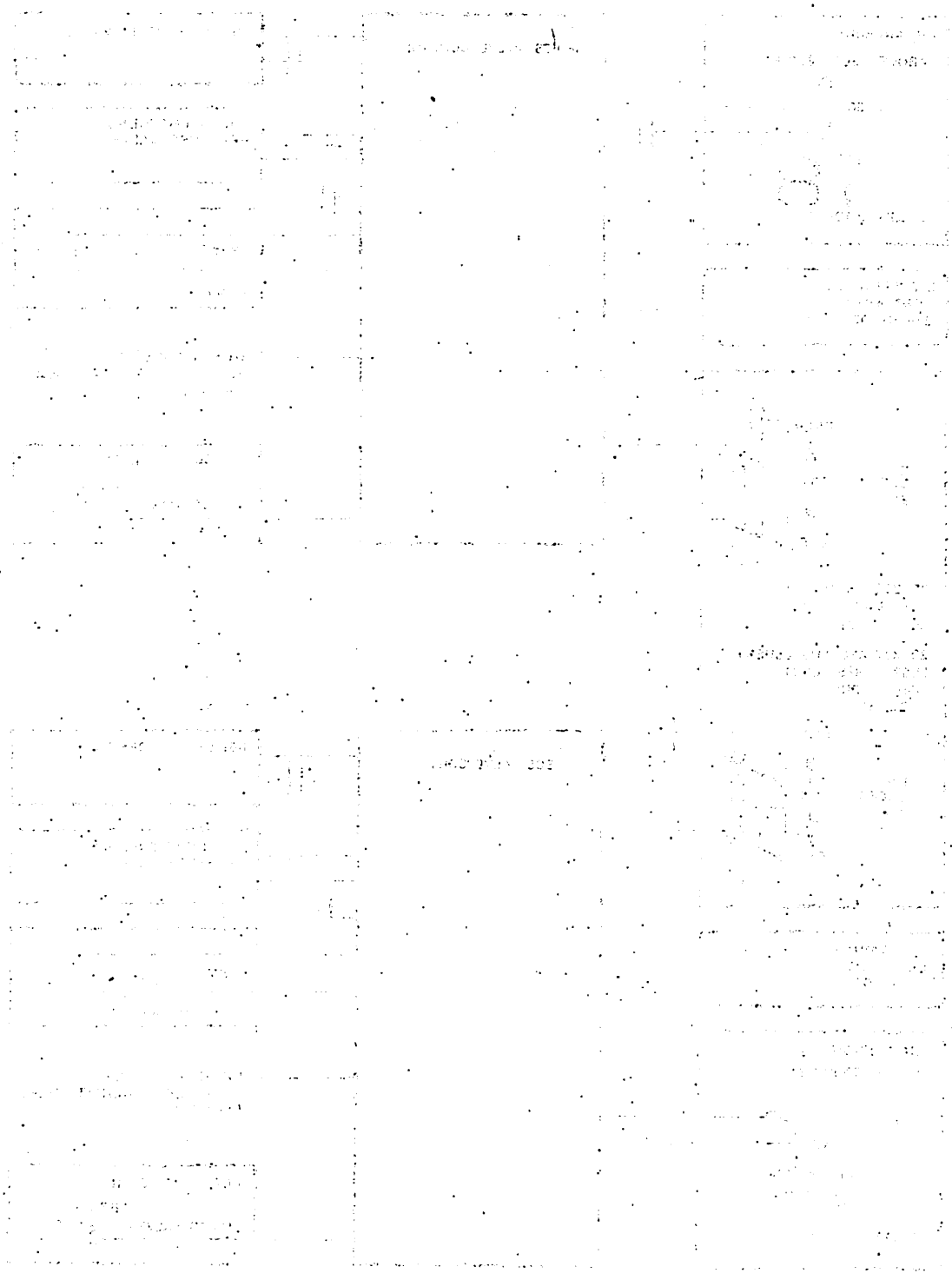
Pneumatic System Schematic
Figure 1 (Sheet 1 of 2)



Pneumatic System Schematic
Figure 1 (Sheet 2 of 2)



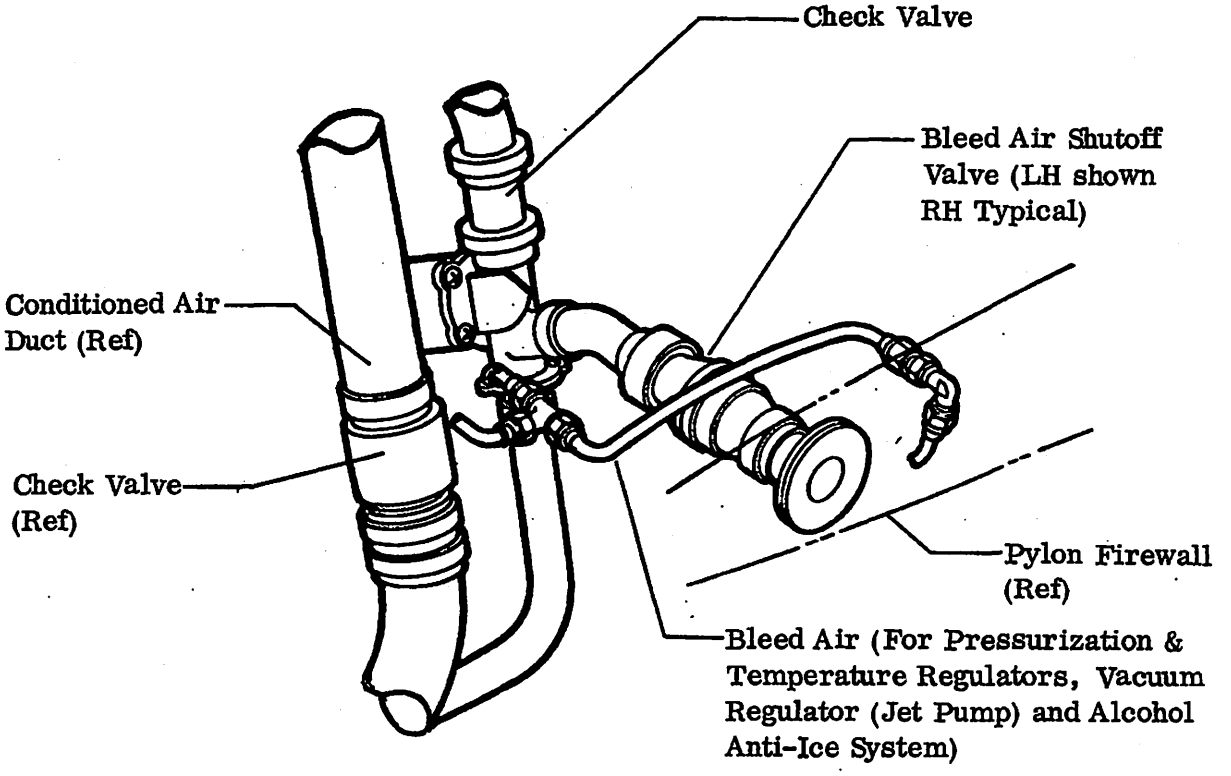
Bleed Air Electrical Control Schematic
Figure 1



BLEED AIR SHUTOFF VALVE - MAINTENANCE PRACTICES

1. General
 A. A bleed air shutoff valve is installed in each engine pylon. Access to the shutoff valve is gained thru access cover on the lower side of the pylon.

2. Removal/Installation
 A. Remove Bleed Air Shutoff Valve (See figure 201)
 (1) Remove access cover from lower side of engine pylon.
 (2) Disconnect electrical plug from shutoff valve.
 (3) Loosen clamps and remove shutoff valve from aircraft.
 B. Install Bleed Air Shutoff Valve (See figure 201)
 (1) Install shutoff valve and secure with clamps. Torque clamps to 35 ($\pm$3) inch-pounds plus drag torque.
 (2) Connect electrical plug to shutoff valve.
 (3) Install access cover and secure with attaching parts.



LH Side Shown, RH Typical

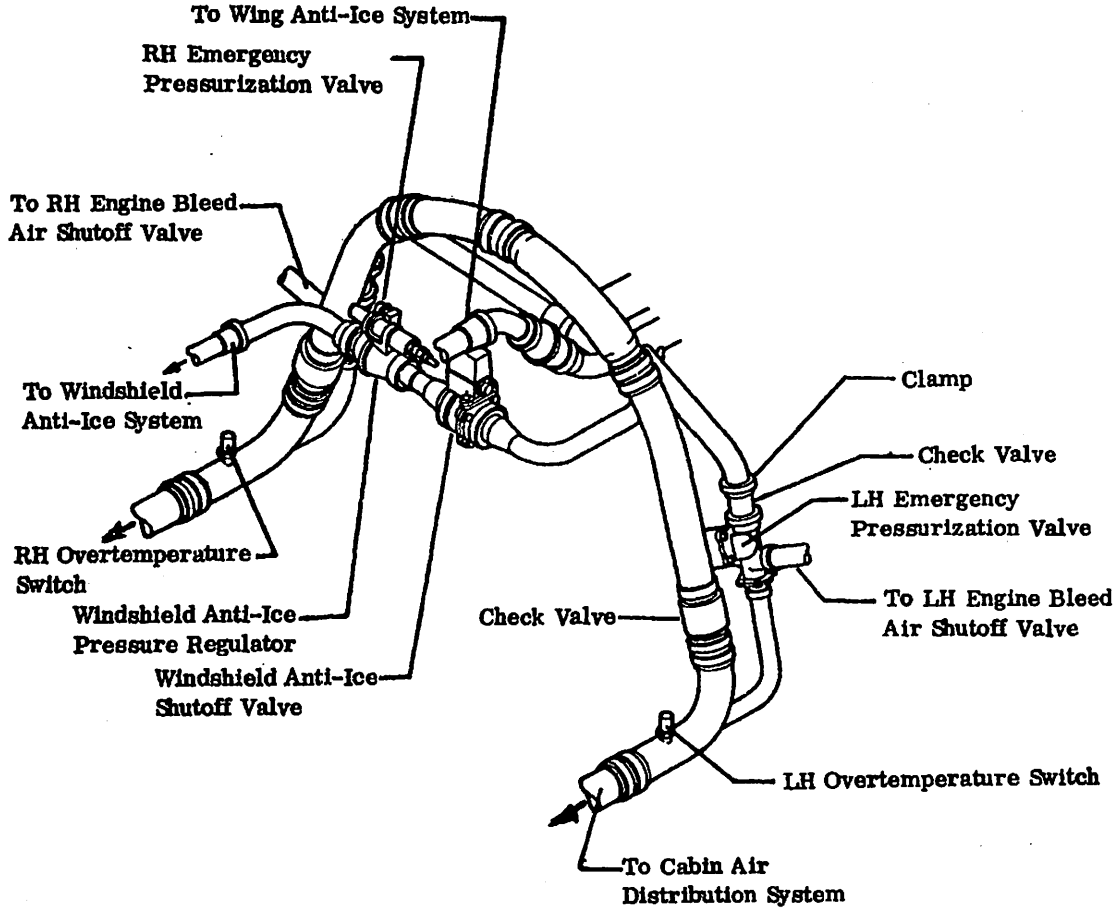
Bleed Air Shutoff Valve Installation
Figure 201



BLEED AIR CHECK VALVE - MAINTENANCE PRACTICES

1. General
 A. A check valve (one RH and one LH) is installed adjacent to each 3-way emergency pressurization valve. The check valve prevents loss of engine bleed air if the engine is shut down.

2. Removal/Installation
 A. Remove Bleed Air Check Valve (See figure 201)
 (1) Lower tailcone access door and disconnect aircraft batteries.
 (2) Loosen clamp and remove check valve from aircraft.
 B. Install Bleed Air Check Valve (See figure 201)
 (1) Install bleed air check valve and secure with clamps. Assure that arrow on check valve points towards the bleed air manifold.
 (2) Torque clamps hand tight.
 (3) Connect aircraft batteries and secure tailcone access door.



Bleed Air Check Valve Installation
Figure 201

ECS VALVES CONTROL BOX - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove ECS Valves Control Box (See figure 201)

(1) Open tailcone access door.

(2) Locate ECS valves control box.

NOTE: E210 is on RH electrical equipment tray and just aft of frame 26. E211 is on LH electrical equipment tray and just aft of frame 26.

(3) Disconnect electrical connector from control box.

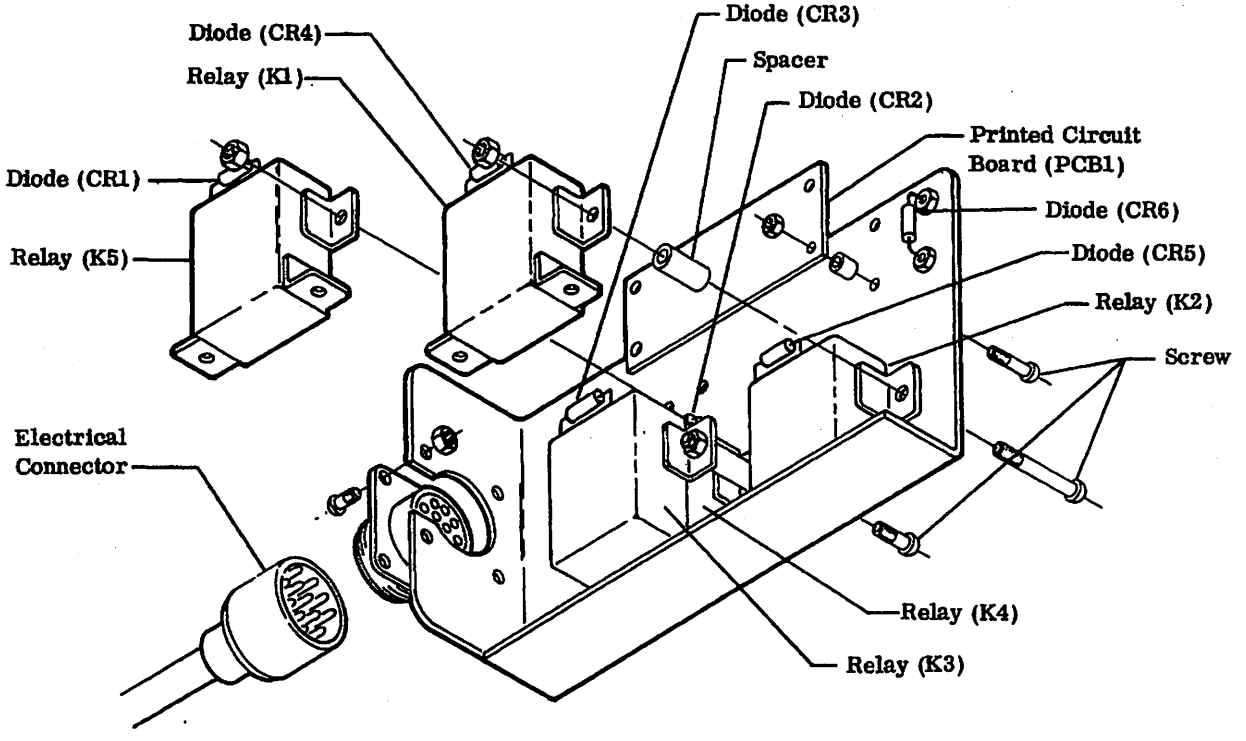
(4) Remove attaching parts and remove control box from aircraft.

B. Install ECS Valves Control Box

(1) Position ECS valves control box on electrical equipment tray and secure with attaching parts.

(2) Connect electrical connector to control box.

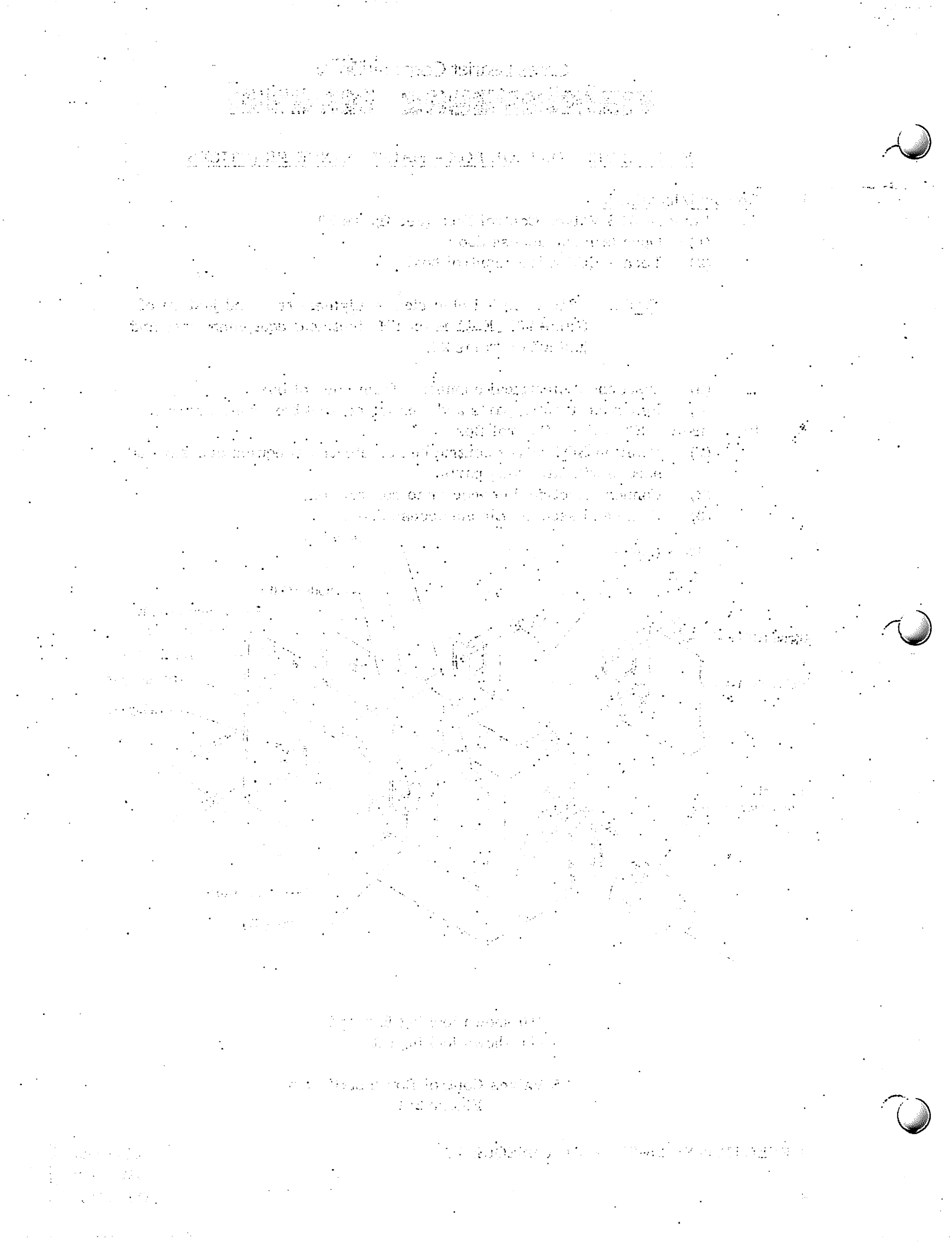
(3) Close and secure tailcone access door.



E210 shown looking forward
E211 shown looking aft

ECS Valves Control Box Installation
Figure 201

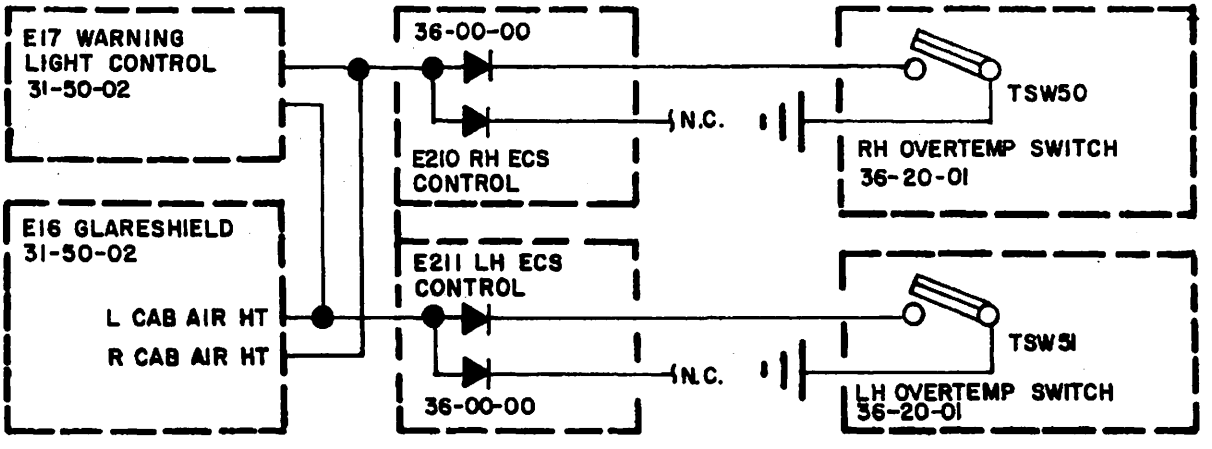
9-120B



INDICATING SYSTEM - DESCRIPTION AND OPERATION

1. General
 - A. The indicating system for the bleed air (pneumatic) system consists of a temperature warning system.
 - B. The warning system protects the cabin from overheating if emergency cabin pressurization is utilized.

2. Description
 - A. Two overtemperature switches are installed, one in the LH air distribution duct and one in the RH air distribution duct. The switches complete a ground circuit to illuminate the respective CAB AIR HT (red) warning light if the temperature of the bleed air routed into the cabin reaches 395 (±5)° F.
 - B. When the air temperature in the duct cools to 370° F (minimum), the overtemperature switch will reset (open) and the warning light will extinguish.

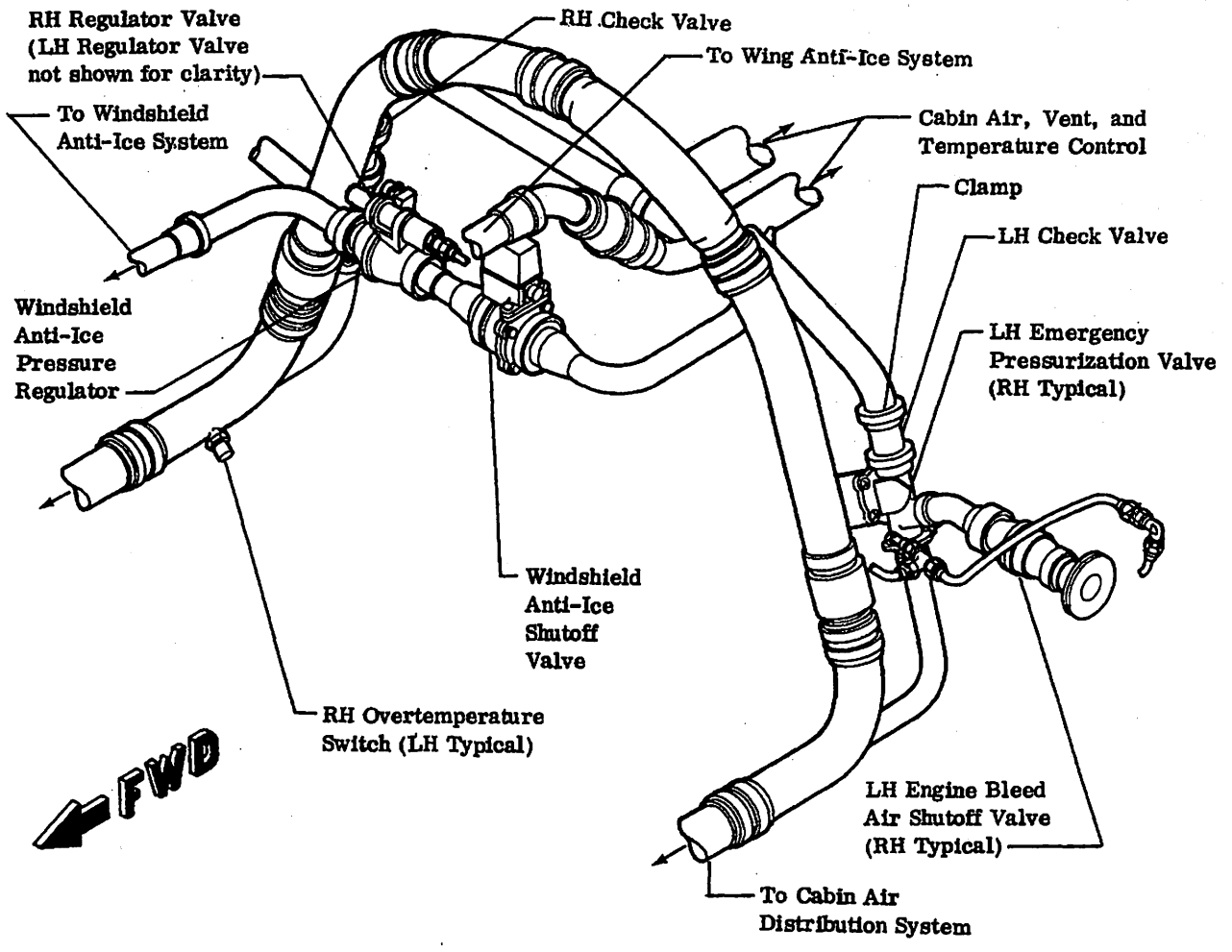


Bleed Air Temperature Warning System Schematic
Figure 1

OVERTEMPERATURE SWITCH - MAINTENANCE PRACTICES

1. General
 A. The overtemperature switch is installed in the air distribution duct (RH and LH) located in the tailcone equipment section.

2. Removal/Installation
 A. Remove Overtemperature Switch (See figure 201)
 (1) Lower tailcone access door and disconnect aircraft batteries.
 (2) Disconnect electrical plug from switch.
 (3) Loosen and remove switch from duct.
 B. Install Overtemperature Switch (See figure 201)
 (1) Install switch in duct.
 (2) Connect electrical plug to switch.
 (3) Connect aircraft batteries and secure tailcone access door.



Bleed Air Overtemperature Switch Installation
Figure 201

13-100C

EFFECTIVITY: 25-227 AND SUBSEQUENT

